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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

MAILED

AUG 06 2007

Technology Center 2100

Application Number: 09/431,366
Filing Date: November 01, 1999
Appellant(s): BAGGETT ET AL.

Denis Maloney
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 20, 2007 appealing from the Office action mailed November 24, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,839,679 B1	LYNCH	1-2005
2005/0177402	WALKER	8-2005
6,122,642	MEHOVIC	9-2000
2003/0167307	FILEPP	9-2003
5,983,217	KHOSRAVI-SICHANI	11-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-18, 30-32 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-18 and 30-32 are directed to abstract idea which does not result in a practical application with provide useful, concrete and tangible result.

Claims 5-18 recite a system. However, the claims lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35

USC 101. They are clearly not a series of steps or acts to be a process nor are they a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 3-4** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 3 recites:

"The method of claim 1 wherein **determining if stored answer is stale comprises**:

scheduling a list of keys...

submitting a query...

storing the result in the cache, by **updating an entry** if present and **adding an entry** if not present in the cache.

However, as shown in Figs. 6, 8A, the scheduling, submitting and storing steps are not part of the determining step. These steps are the steps to be performed after the determining step. The steps recited in claim 3 are not for "determining if stored answer is stale" but for updating the cache. It is impossible to determine "if stored answer is stale" by performing the step of claim 3, simply because claim 3 recites the step for updating the cache. Similar rationale is also applied to claim 4.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 5, 19, 23** are rejected under 35 U.S.C. 102(e) as being anticipated by Lynch et al. (US 6,839,679 B1), hereinafter "**Lynch**".

As per claim 1, Lynch teaches a method for managing a cache including entries that correspond to seat availability information (Col. 3 lines 33-40) comprises:

- "proactively determining if a stored answer in the cache is stale" at Col. 5 line 59 to Col. 6 line 14 and Fig. 3;

- "the stored answer corresponding to seat availability information for a seat on a mode of transportation" at Col. 3 line 64 to Col. 4 line 14 and Fig. 1, element 18;
- "with determined based on the needs of a travel planning system that makes queries to the cache for obtaining the seat availability information" at Col. 5 lines 59 to Col. 6 line 14;
- "and if the stored answer pertaining to seat availability information is stale, sending an availability to a source of seat availability information for the mode of transportation based on determining that the answer was stale" at Col. 6 lines 15-35.

As per claim 5, Lynch teaches an availability system for travel planning system (Fig. 1) comprises:

- "a cache including a plurality of entries of availability information of seat for a mode of transportation" at Col. 3 line 56 to Col. 4 line 14 and Fig. 1, element 18;
- "a cache manager that manages a quality level of entry information in the cache by proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache" at Col. 5 line 59 to Col. 6 line 14;
- "with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes query to the cache for obtaining seat availability information" at Col. 5 line 59 to Col. 6 line 14;

- "and that sends an availability query to source of seat availability information for the mode of transportation based on determining that the seat availability information in the cache was stale" at Col. 6 lines 15-35.

As per claim 19, Lynch teaches a computer program product for managing a cache for predicting availability information for a mode of transportation comprises:

- "proactively determined whether a stored answer in the cache is stale" at Col. 5 line 59 to Col. 6 line 14 and Fig. 3;
- "the stored answer corresponding to seat availability information for a seat on the mode of transportation" at Col. 3 line 56 to Col. 4 line 14
- "with instructions to determine being based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information" at Col. 5 line 59 to Col. 6 line 14;
- "update the stored answer in the cache when the stored answer is stale by sending an availability query to a source of availability information for the mode of transportation" at Col. 6 lines 15-35.

As per claim 23, Lynch teaches a computer program product comprising:

- "cache entries of seat availability information for a mode of transportation" Col. 3 line 56 to Col. 4 line 14 and Fig. 1, element 18;
- "manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on

needs of a travel planning system that makes queries to the cache for seat availability information, to determined when an entry in the cache should be added, deleted or modified" Col. 5 line 59 to Col. 6 line 14;

- "delete or modify the entry based on determining that the entry should be deleted or modified" at Col. 6 lines 15-35;
- "proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified" Col. 6 lines 15-35.

6. **Claims 23, 30** are rejected under 35 U.S.C. 102(e) as being anticipated by Walker et al. (US 2005/0177402 A1), hereinafter "Walker".

As per claim 23, Walker teaches a computer program product comprising:

- "cache entries of seat availability information for a mode of transportation" at [0048]
- "manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determined when an entry in the cache should be added, deleted or modified" at [0078]-[0082] and Fig. 13;
- "delete or modify the entry based on determining that the entry should be deleted or modified" at [0081]-[0082];

- "proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified" at [0076].

As per claim 30, Walker teaches a method for managing availability information for a seat on mode of transportation comprises:

- "determining which entries to add, delete, or update in a cache by monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have high demand for availability information" at [0078]-[0082] and Fig. 13a-b;
- "proactively updating entries in the cache if an instance of transportation of transportation is determined to have a higher than average or higher than expected demand" at [0037], [0078]-[0082].

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 1-3, 5-21, 23-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mehovic (US 6,122,642 A) and in view of Filepp et al. (US 2003/0167307 A1), hereinafter referred to as Mehovic and Filepp.

As per claims 1, 5, 19, 23 and 30, Mehovic substantially teaches the claimed invention including an airline computerize reservation system ("CRS") to provide flight and seat availability information (Col. 2 lines 5-20), Mehovic also teaches at Fig. 4 a cache (Fig. 4, element 20) stores data propagated from the CRS 12 data, which is used to response to queries from client 26 (Col. 3 lines 54-58).

The different between Mehovic's system and the claimed invention is that Mehovic uses different cache management algorithm. Mehovic synchronizes the cache 20 with the CRS by propagating data immediately after CRS 12 updates the data or at definable intervals of time (Col. 3 lines 59-65), and therefore does not teach proactively update the cache based on frequency of access to the cache as claimed. However, Filepp teaches an airline reservation system (page 4, [0052]) utilizing caches storage (Fig. 2, 302) wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823]). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Filepp's cache management algorithm with Mehovic's CRS system so that "only the latest version of the object will be provided to guarantee currency of information to the user" as noted by Filepp at page 50, [0821]. By factoring the frequency of updating of updating of the objects in order to determine whether cached objects are current, Mehovic's system would detect the fights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is

updated and current, therefore prevent overbooking or assigning the same seat to multiple passengers.

As per claim 2, Mehovic and Filepp teach the method of claim 1 as discussed above. Filepp also teaches: "monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information" at pages 50-51, [0821]-[0827].

As per claim 3, Mehovic and Filepp teach the method of claim 1 as discussed above. Mehovic also teaches: "scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key on the list in the order given, submitting a query to the availability source; and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache." at Col. 6 line 40 to Col. 7 line 15.

As per claim 6, Mehovic and Filepp teach the system of claim 5 as discussed above. Filepp also teaches the cache manager determines when an entry should be added to the cache at [0826].

As per claim 7, Mehovic and Filepp teach the system of claim 5 as discussed above. Filepp also teaches the cache manager determines when an entry should be deleted from the cache at [0827].

As per claim 8, Mehovic and Filepp teach the system of claim 5 as discussed above. Filepp also teaches the cache manager determines when an entry already in the cache should be modified at [0821].

As per claim 9, Mehovic and Filepp teach the system of claim 5 as discussed above. Mehovic also teach entries to be added, modified, or delete are obtained by asynchronous notification from external systems at Col. 3 lines 60-65.

As per claim 10, Mehovic and Filepp teach the system of claim 9 as discussed above. Filepp also teach entries to be added, modified, or delete are taken from a list or multiple list at [0830].

As per claim 11, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches the entries in the list include predetermined orderings or priority at [0830].

As per claim 12, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or delete are determined from a distribution or nature of availability queries poses to the cache at [0826]-[0827].

As per claim 13, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future at [0826]-[0830].

As per claim 14, Mehovic and Filepp teach the system of claim 13 as discussed above. Filepp also teaches the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actually availability data sources" at [0826]-[0830].

As per claim 15, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by comparing actual answer or cached answers to predictions made by a predictor or model of the availability information at [0826]-[0830].

As per claim 16, Mehovic and Filepp teach the system of claim 13 as discussed above. Filepp also teach the predictor used to guide the cache manager operation predicts the rate of change or time of change at [0826]-[0830].

As per claim 17, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by prior knowledge at [0826]-[0830].

As per claim 18, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be modified or deleted are determined by the data of travel or the seat in comparison to the current date at [0826]-[0830].

Independent claims 20-21, 24-29, 30-32 recite similar limitations as discussed above. Claims 20-21, 24-29 and 30-32 are also rejected by the same reasons.

9. **Claims 4, 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mehovic and Filepp as applied to claims above, and further in view of Khosravi-Sichani (US 5,983,217 A), hereinafter "Khosravi".

As per claims 4, 22, Mehovic and Filepp teach the method of claims 1, 19 as discussed above. Mehovic and Filepp do not teach the step of processing query entry using round-robin algorithm as claimed. However, querying using round-robin is well know in the art, as exemplary by Khosravi. Khosravi teaches a method of querying

replicate database using round-robin algorithm in order to "provide an even loadsharing of queries" (Col. 1 lines 55-65). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Khosravi with Mehovic and Filepp's teaching because employing round-robin algorithm would ensure that all queries are processed equally and providing an even load sharing of queries.

(10) Response to Argument

Background of the invention.

Travel planning system for air travel is well known in the art. Travel agents use the system to connect via a network to a database maintained by an airline to retrieve seat availability data and purchase tickets.

Appellant's specification notes that the availability data is expected to change slowly and live availability query to the airline can be costly in both time and money (Appellant's Specification page 13 lines 1-11) and proposes "a cache is inserted between the travel planning system and the source of availability data (i.e., airline's database) so that the travel planning system can query the local cache for seat availability information instead of the airline's database to reduce time (i.e. connection time via the network) and money (i.e., fees paid to the airline for database access).

Since the availability data is changed as other customers reserved seats or flights are added or canceled (Specification page 14, lines 27-32), which cause the data in the cache become **stale**, meaning that the information in **the cache is not correct, current, complete** (Specification page 3, line 18-19). Appellant's invention is therefore

directed to method for managing information in the cache to make sure that the information is correct, current, complete by proactively (i.e., periodically) determining if the information is stale based on a criterion (e.g. elapse time since the information is stored, see Specification page 11, lines 10-15), and sending an availability query direct to the airline's database (Specification page 11, lines 27-32), if it is determined that the information in cache is stale which would result in incorrect or incomplete information returned to the travel agent making query to the cache.

Appellant's arguments have been carefully considered but are not persuasive. All grounds of rejection has been maintained in this Examiner Answer. The examiner respectfully traverses appellant's arguments.

[1] Claims 1-18, 30-32 are directed to non-statutory subject matter under 35 U.S.C 101

Regarding claims 1-18, appellant argued that claim 1 produces a useful, concrete and tangible result, namely, "management of a cache of seat availability information" and "sending query to a source of seat availability information". The examiner respectfully disagree. As stated in the Interim Guidelines, a claim is for a practical application of an abstract idea, law of nature, or natural phenomenon when the claimed invention "transforms" an article or physical object to a different state or thing, or when the **claimed invention** produces a **useful, concrete and tangible** result. See MPEP 2106, subsection IV.C.2.

The **claimed invention** as recited in claim 1 is directed to a method or process comprising two steps:

- determining if a stored answer in the cache is stale;
- sending an availability query to a source if the cache is stale.

Clearly, the final result of the claimed invention is not "management of a cache of seat availability information" as agued because the claimed steps do not recite how the cached being managed. Second, "sending query to a source of availability information" is neither useful, concrete, nor tangible. While the result of a query may be useful, it is unclear how "sending a query to a source" is useful. Further, "sending query to a source" is not concrete nor tangible because, as recited in the claim, this step is optional because it only perform if the condition is satisfied (i.e. "if the cache is stale"), and it is unclear how the sending query step relates to "managing a cache" as recited in the preamble.

Regarding claim 5-18, appellant argued that claim 5 is statutory because it is directed to a system which includes two physical articles, a cache and a cache manager. However, appellant's specification does **not** provide any teaching which show that a cache manager is implemented in hardware, and page 12, line 1 provides that a cache can be implemented using **software** cache. Further, claim 23 provides evident that the cache manger is implemented using computer instructions, or software. The system of claim 5 is therefore comprise two software components, or **software *per se*** and therefore non-statutory. Dependent claims 6-18 do not correct the deficiency of claim 5 and are also rejected.

[2] Claims 3-4 are rejected under 35 U.S.C 112 first paragraph.

Claim 3 depends upon claim 1, which provide detail implementation for the step of determining if the stored answer in the cache is stale recited in claim 1. Appellant admitted that the steps in claim 3 are ,in fact , directed to **how the cache is updated**. Claim 3 is therefore fails to comply with the enabling requirement because the specification does not explain how to determine if the cache is stale by updating the cache ??? . After updating, the stored answer in cache is always NOT stale, and therefore the if condition recited in claim 1 will never be satisfied. Rewritten claim 3 in independent form will by replacing the determining step in claim 1 with the steps of claim 3 clearly indicate that the claim is not enable. Similar rationale is also applied to claim 4.

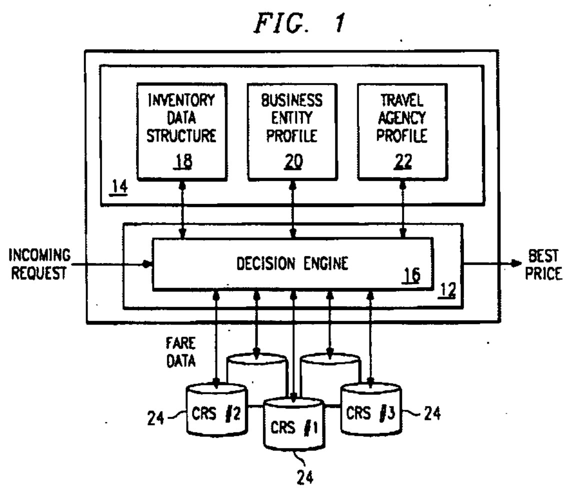
[3] Claims 1, 5, 19, 23 are anticipated by Lynch et al. (US 6,839,679 B1).

Claim 1.

Regarding claim 1, appellant argued that Lynch does not teach any claimed limitation. The examiner respectfully disagree.

Comparing Lynch's system as shown in Fig. 1 to Appellant's system as shown in Fig. 7 clearly show the similarity between two systems, where the database 14 is mapped to the cache 154, Decision Engine is mapped to cache manager 150, CRS 24 is mapped to source data 20c and incoming and best price is mapped to query and answer.

Lynch's system:



Appellant's System:

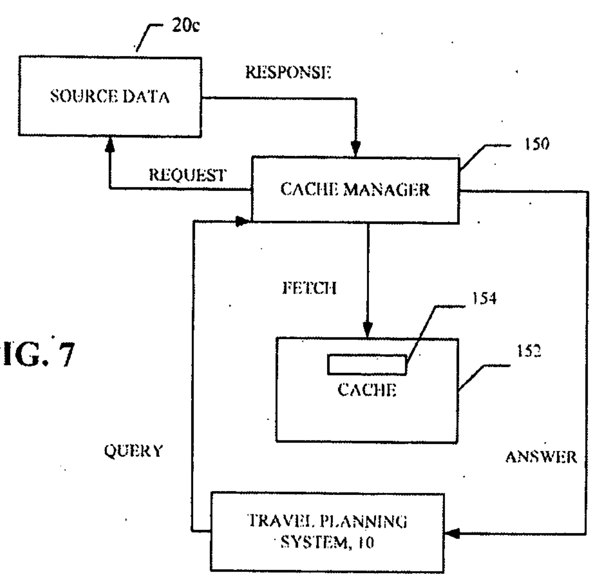


FIG. 7

First, appellant argued that Lynch does not teach "a cache including entries that correspond to seat availability information". On the contrary, Lynch at Col. 3 lines 33-

40 and Fig. 1 an automated travel planning system 10 includes a database 14, reproduced below:

> The first sub-module of decision engine module 16, which can be described as an **inventory update** sub-module, preferably functions to direct system 10 to **periodically access and retrieve inventory information from one or more computer reservation systems 24** used by the travel agency. The inventory update sub-module further functions to **store the inventory information in database 14.**

Clearly, the database 14 stores airline inventory data retrieved from the computer reservation system 24 (CRS), and therefore same as claimed "a cache including entries that correspond to seat availability information".

Appellant's specification also describes the cache as a database storing information retrieved from an airline reservation system at page 11, lines 28-32 reproduced below:

> "The answer that is received from the airline availability system 66 is returned as the answer and can be used to update the **database 70. The database 70 can be implemented** using various approaches including hierarchical, relational or object oriented database, **or alternatively**, a software or hardware **cache.** (Appellant's specification)

Appellant further argued that "inventory information" disclosed by Lynch is flight, fare and fare rule information and not "seat availability" information, the examiner respectfully disagree. Webster's dictionary defines "inventory" as "the supply of good and material on hand". For example, inventory of a hotel is room availability information and "inventory information" provide by an airline reservation system is "seat availability"

of flights. **It is unreasonable to state that Lynch provide flight and fare information but does not provide "seat availability" information** because flight and fare information indicates seats of that flight are available for purchase. Further, Appellant's specification at page 5, lines 24-24 describes that the airline availability system 66 is maintained by each airline. Lynch teaches at Col. 4 lines 45-55 that the source of inventory data is maintains by American Airline. Both Appellant and Lynch's system receive data from a same data source, therefore the data stored in the cache are the same.

Appellant further argued that Lynch does not suggest the claimed management scheme, nor indeed any cache that a travel planning system can query to obtain the seat availability information. On the contrary, as discussed above, Lynch teaches the database 14 containing inventory data 18, which is used by a travel agent to obtain seat availability information without connecting to the CRS 24 (Col. 2 lines 1-12).

Appellant further argued that the cache management algorithm taught by Lynch is not based on the need of a travel planning system. The examiner respectfully disagree. To understand appellant's cache management algorithm, appellant's specification describes:

"The process 94 will **determine if the stored answer is stale** by **comparing the time** of the query to a threshold time that can be either a preset threshold such as a **certain number of minutes, hours or days** or preferably a **variable threshold** that is determined in accordance with a threshold level predictor".

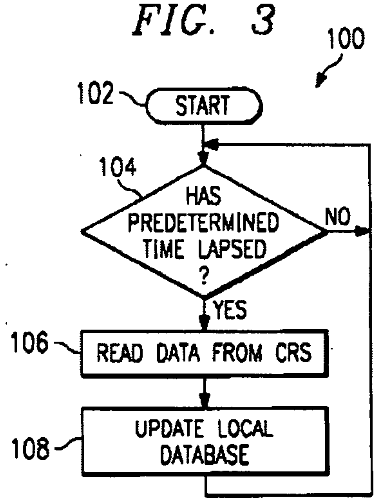
(Appellant's Specification page 11, lines 15)

Similarly, Lynch teaches at Col. 5 lines 59 to Col. 6 line 14 and Fig. 3 the step of periodically (i.e. "proactively") updating the cache if a predetermined time has elapsed since inventory information was last obtained from the CRS 24 by obtaining new information from the CRS 24 and stores the obtained information into database 14 (i.e. "cache").

At block 104, system 10 **determines whether a predetermined time has elapsed** since inventory information was last obtained from computer reservation systems 24. **Preferably, the predetermined time can be set by a user of the system according to the user's needs**. For example, a travel agency which desires to have the most current inventory information available can instruct system 10 to access the computer reservation systems **twice every hour**. On the other hand, a travel agency that wishes to maintain a low hits-to-bookings ratio for each computer reservation system can instruct system 10 to access the computer reservation systems **twice each day**. (Col. 6 lines 3-14)

Lynch teaches "the predetermined time can be set by the **user's needs**", and therefore anticipates the claimed limitation "based on the need of a travel planning system that makes queries to the cache".

FIG. 3



Finally, appellant argued that Lynch does not teach "if the stored answer pertaining to seat availability information is stale, sending an availability query to a source of seat availability". On the contrary, Lynch teaches at Col. 6 lines 15-30 that if the predetermined time has elapsed (i.e., the store answer in cache is stale), the system 10 is connected to the CRS 24 to read inventory information.

Claim 5.

Regarding claim 5, appellant argued that Lynch does not teaches "proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the ache according to a criterion related to needs of a travel planning system that makes query to the cache for obtaining seat availability information". On the contrary, Lynch teaches at Col. 5 lines 59 to Col. 6 line 14 and Fig. 3 the step of periodically (i.e. "proactively") updating the cache if a predetermined time has elapsed since inventory information was last obtained from the CRS 24 by obtaining new information from the CRS 24 and stores the obtained information into database 14 (i.e. "cache"). Lynch also teaches "the predetermined time can be set by the **user's needs**", and therefore anticipates the claimed limitation "based on the need of a travel planning system that makes queries to the cache".

Appellant again argued that airline "inventory information" such as flight and fare information is not "seat availability" information, the examiner respectfully disagree as discussed above.

<u>Claim 19</u>.

Regarding claim 19, appellant argued that Lynch does not teaches "proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the ache according to a criterion related to needs of a travel planning system that makes query to the cache for obtaining seat availability information". On the contrary, Lynch teaches at Col. 5 lines 59 to Col. 6 line 14 and Fig. 3 the step of periodically (i.e. "proactively") updating the cache if a predetermined time has elapsed since inventory information was last obtained from the CRS 24 by obtaining new information from the CRS 24 and stores the obtained information into database 14 (i.e. "cache"). Lynch also teaches "the predetermined time can be set by the **user's needs**", and therefore anticipates the claimed limitation "based on the need of a travel planning system that makes queries to the cache".

Appellant further argued that Lynch does not teach "predicting availability information for mode of transportation". The examiner respectfully submits that while the preamble recite "managing a cache for predicting availability information", the body of the claim does not recites any step for predicting or how to predict availability information in the cache. The limitation therefore has no patentable weight and should not be considered. On the other hand, Lynch compares the times with a threshold to predict status of availability information in the cache by presuming that the cache is stale if the predetermined time lapsed.

Claim 23

Regarding claim 23, appellant argued that Lynch does not teaches "proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the ache according to a criterion related to needs of a travel planning system that makes query to the cache for obtaining seat availability information". On the contrary, Lynch teaches at Col. 5 lines 59 to Col. 6 line 14 and Fig. 3 the step of periodically (i.e. "proactively") updating the cache if a predetermined time has elapsed since inventory information was last obtained from the CRS 24 by obtaining new information from the CRS 24 and stores the obtained information into database 14 (i.e. "cache"). Lynch also teaches "the predetermined time can be set by the **user's needs**", and therefore anticipates the claimed limitation "based on the need of a travel planning system that makes queries to the cache".

Appellant further argued that Lynch does not teach evaluating entries in the cache according to a criterion" and "determine when an entry in the cache should be added, deleted, or modified". On the contrary, Lynch compares the time since the entries are stored in the cache with a predetermined time to determine whether to update entries in the cache (See Col. 6 lines 3-30). Updating data in cache with new data obtain from the CRS involves adding new data, deleting obsolete data and modifying data as claimed.

[4] Claims 23 and 30 are anticipated by Walker (US 2005/0177402 A1).

Claim 23.

Regarding claim 23, Appellant argued that Walker does not teach "manage a quality level of the entries in the cache by evaluation entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified". On the contrary, Walker teaches at [0048] and Fig. 2 the RMS 200 contains a seat allocation database 245 (i.e. "cache entries of seat availability information"). Walker teaches at [0081]-[0082] the step of updating the cache (i.e., seat allocation database 45) by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system (i.e., "analyzes the records retrieved from databases 245 corresponding to each actual flight" and eliminating or increasing the remaining inventory in the database 245.

[0078] FIGS. 13a and 13b are flow charts illustrating an exemplary process by which an airline's **RMS dynamically increases or decreases the allocation of inventory** to a special fare listing.

[0081] In step 1310, **the RMS analyzes the records retrieved from database 245 corresponding to each actual flight** to determine whether each actual flight is completely booked (e.g., in FIG. 8, "Remaining Inventory"=0). If each flight is completely booked, the RMS 200, in step 1315, accesses database 245 and **eliminates the remaining inventory allocated to the special fare listing** (e.g., "Remaining Inventory">0). For example, a special fare listing during Christmas week may not have any inventory allocated to it because of the **heavy traffic that historically comes during the holiday seasons**.

[0082] If each flight is not completely booked, the RMS 200, in step 1320, determines whether the "Total Inventory Booked" (See FIG. 8) for the special fare listing exceeds the remaining inventory for the actual flights. If it does, the RMS 200, in step 1315, accesses database 245 and eliminates the remaining

inventory allocated to the special fare listing. However, if the total inventory booked for the special fare listing does not exceed the remaining inventory for the actual flights, the RMS proceeds to step 1325 and determines whether the remaining inventory for the actual flights exceeds the remaining inventory for the special fare listing. If the remaining inventory for the actual flights does not exceed the remaining inventory for the special fare listing, in step 1330, the RMS 200 maintains the current remaining inventory for the special fare listing. If the remaining inventory for the actual flights exceeds the remaining inventory for the special fare listing, **the RMS 200, in step 1335 of FIG. 13b, increases the remaining inventory for the special fare listing** at a fare/class below the currently available fare/class on the actual flights and **updates the seat allocation database 245** and pricing and restrictions databases 250, accordingly.

Claim 30.

Regarding claim 30, applicant argued that Walker does not describe that the determining is done by "monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have a high demand for availability information. On the contrary, as seen in paragraph [0081] reproduced above, Walker teaches the step of monitoring and examining historical data to determine instances of transportation have a high demand for availability information (i.e. "Holiday seasons") and adjusting seat inventory data in the cache accordingly.

[5] Claims 1-3, 5-21, 23-32 are unpatentable over Mehovic in view of Filepp.

Claims 1 and 19.

Regarding claims 1, appellant argued that "Mehovic fails to disclose that the CRS includes a revenue management system or the like" In response to applicant's argument

that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e.," the CRS includes a revenue management system or the like") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

appellant argued that Mehovic does not teach "a cache including entries that correspond to seat availability information" because Mehovic does not explicitly teach the American Airline's SABRE Computerized Reservation System contain "seat availability information", which is then propagated to the RDBMS for retrieval and use by the end user. The examiner respectfully submits that the SABRE CRS system is well known in the art and has been used by travel agents since 1960s to retrieve flight information, **seat availability** and booking information. To illustrate this fact, both Lynch and Walker references (these references were used on separated rejections in this Office Action) clearly show that the SABRE CRS system contains "seat availability information". For example, Lynch teaches: "Each computer reservation system 24 may be one or more commercially available computer reservation system such as, for example, SABRE owned by American Airline... Computer reservation system 24 provide online travel service inventory information"(Col. 4 lines 45-55). Walker also teaches: "The inventory and pricing information for both the special fare listing and the actual flights is transmitted by the ASR 150 to the CRS 300... Example of such a CRS are known under the trade manes Apollo, Sabre, System One and the like" at [0038]. Clearly, in is undeniable that the SABRE contain "seat availability data"; and the data

contained in the SABRE is propagated into the RDBMS, therefore, after propagation, the RDBMS also contains "seat availability data" as claimed.

Further, Mehovic's PNR (passenger name record) also contains "seat availability information" because it includes "flight, booking-code, fare and payment information", which clearly shows the seat booked by that particular passenger is unavailable because it is already booked.

Further more, it is noted that theses differences are only found in the non-functional data stored on storage devices. The data identify "seat availability information" is not functionally related to the claimed method. For example, replacing "seat availability information" with equivalent data such as "parking space availability information" does not effect the claimed method. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, see Cf. In re Gulack, 703 F.2d 1385, 217 USPQ 401, 404 (Fed. Cir 1983); In re Lowry, 32 F. 3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994).

Appellant also argued that the combination of Mehovic with Filepp is not suggested. On the contrary, Mehovic teaches a CRS utilizing a cache (i.e. RDBMS) to response to user's query while Filepp teaches an airline reservation system (page 4, [0052]) utilizing caches storage (Fig. 2, 302) wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823]). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Filepp's cache management algorithm with Mehovic's CRS system so that "only the latest version of the object will be provided

to guarantee currency of information to the user" as noted by Filepp at page 50, [0821]. By factoring the frequency of updating of updating of the objects in order to determine whether cached objects are current, Mehovic's system would detect the fights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is updated and current, therefore prevent overbooking or assigning the same seat to multiple passengers.

Further, the different between Mehovic's system and the claimed invention is that Mehovic uses different cache management algorithm. Mehovic synchronizes the cache 20 with the CRS by propagating data immediately after CRS 12 updates the data or at definable intervals of time (Col. 3 lines 59-65), and but does not teach proactively update the cache based on frequency of access to the cache as claimed. It is obvious to an ordinary skill in the art at the time of the invention was made that the definable intervals of time must be configured based on how often the data in the source is modified which causes unsynchronized between the cache and the data source. For example, if the cache data containing income tax data which is updated once a year, then it would have been obvious that the cache data are not required to be updated every day to synchronize with the source data. On the other hand, if the cache data containing high frequent access data such as inventory data, then the cache must be updated more often to be synchronize with the source.

In response to appellants' argument that "Mehovic does not proactively determine if the cache are stale", the examiner respectfully submit that Mehovic teaches at Col. 3 lines 60-65 the steps for data propagation from the SABRE system to the relational database (i.e., updating the data in relational database 24 using the data from the SABRE system 12), wherein the propagation occur immediately after the system 12 updates the data, or at definable intervals of time. It is apparent that after the data in the SABRE system is updated, the data stored in the relational database 24 is stale. Mehovic therefore monitors the data in the SABRE system 12 to determine if the cache is stale. As soon as the data in the SABRE system 12 is updated, the updated data is propagated to the relational database in order to keep the cache current, or in sync with the SABRE system (Col. 3 lines 59-65). Mehovic's cache update method is "proactively" because the data in the cache is updated before it is used to provide information to the client 26.

Appellant argued that claim 1 requires that the criterion for updating the seat availability information is based on the needs of the travel planning system that make queries to the cache, not frequency of access to the objects in the caches", but does not explain what the criterion is and how they are different. The claim 1 requires "criterion determined based on needs of a travel planning system that make query to the cache", therefore, if the needs of a travel planning system are current and updated information, then Mehovic anticipates this limitation because Mehovic teach the step of propagating updated data to the cache 20 in order to provide current and updated information to the client 26 which make query to the cache. Claim 2 further defines the step of

determining, which comprises monitoring queries made to the cache to determine which flight have a high demand for availability information. The examiner interprets this limitation as monitoring frequency of accessing to the object in cache, because the flight has high demand implies that the data about that flight is accessed more frequent.

Claim 1 is therefore directed to a method for updating data in caches based on the frequency of accessing to the object in caches. An ordinary skill in the art would recognize that if an object in cache in accessed more frequent, the data contained in the object will expired faster and therefore it would requires update from the data source for updated data. For example, if the data for a particular flight is accessed more frequently, the number of available seats are also changed more frequently, therefore updating the flight data from the data source is needed so that the availability information for that flight is updated and current, in order to prevent overbooking or assigning the same seat to multiple passengers. The Filepp reference is relied on by the examiner to show this fact.

Appellant argued that Filepp does not teach: "wherein the object in caches are proactively updated based on frequency of access to the objects in the caches". On the contrary, Filepp teaches at [0821] that "when objects are requested from object storage facility 439, only the latest version of the object will be provided to guarantee currency of information to the user". This means that the objects in cache 439 are proactively updated, so that in only contains the latest version of the object, before receiving request for the objects. Filepp also teaches at [0823] that "The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of

the objects", which means that the frequency of updating object in caches is based on the frequency of updating the object as claimed.

Claims 2, 20, 30 and 31.

Regarding claims 2, 20, 30 and 31, appellant argued that Mehovic and Filepp as combined, do not teach "monitoring availability queries make to the cache by a travel planning system to determine which flight, sets of flights, the flight for a certain day, date, or market have a high demand for availability information. On the contrary, Mehovic teaches a system to provide seat availability information for flights using data stored in a cache 20. Filepp teaches a method for updating object stored in a caches based on the frequency of access to the objects in the caches. When Mehovic and Filepp are combined, the objects in Filepp's caches should be interpreted as data related to seat availability information as taught by Mehovic. Therefore, Filepp teaches a method of monitor the access to objects to detect the frequency of access to the object, then updating objects in caches to keep them current based on the frequency of access to the objects, when implemented in Mehovic system, would result in monitor access to flight data objects (i.e., flight , set of flight, flight for a certain day, market) and high frequency of access to the objects corresponds to high demand flights.

Claims 3 and 21.

Regarding claims 3 and 21, appellant argued that Mehovic and Filepp do not teaches "scheduling a list of keys where the list of keys are identifiers of specific

instance of transportation to update or add." On the contrary, Mehovic teaches at Col. 6 line 40 to Col. 7 line 14 a set of unique identifiers which are used to retrieve a specific instance of transportation (i.e., flight record) from the CRS. For example, Mehovic teaches the set of keys comprises Airline Code, Flight Number, Departure City Code, Arrival City Code, and Departure Date.

Claims 5, 7-11, 23-26.

Claim 5 recite a system for performing similar method as in claim 1. Appellant's argument regarding the claims are similar to the claim 1 discussed above and therefore not persuasive in view of the above discussion.

Claim 6

Regarding claim 6, appellant argued that Filepp does not teach the cache manager determine when an entry should be added to the cache. On the contrary, Fielpp teaches the Least Frequently Used algorithm to delete least frequently used from limited size cache to make room for new entry. Therefore, the determining what object to be deleted from cache will lead to determines when an entry should be added to the cache, as an empty space is available in the cache.

Claims 12 and 27

Regarding claim 12, appellant argued that Filepp fails to teach entries to be deleted are determined from the nature of availability queries posed to the cache. On the contrary, as discussed above, Filepp teaches at [0821] that "when objects are requested from object storage facility 439, only the latest version of the object will be provided to guarantee currency of information to the user". This means that the objects in cache 439 are proactively updated, so that in only contains the latest version of the object, before receiving request for the objects. Filepp also teaches at [0823] that "The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of the objects", which means that the frequency of updating object in caches is based on the frequency of updating the object as claimed.

Claims 13-16 and 28-29

Regarding claim 13, appellant argued that Filepp fails to teaches "entries to be added, modified, or deleted are determined by using a predictor or model of the availability query which are likely to be posted or are likely to be useful in the future". On the contrary, Filepp teaches at [0826] the LRU algorithm for deleting object in cache, wherein the algorithm is based on an assumption (or prediction) that the least recently used object is less likely to be used or to be useful in the future and should be removed from the cache.

Claims 14-18 and 29.

Regarding claim 14, appellant argued that Filepp does not teaches any predictor based on statistical classifier, database or cache of historical data ...On the contrary, as discussed in claim 13 above, Filepp predicts what object should be remove from cache using historical data of how recent the objects in cache are accessed and remove the least recently used object, which is less likely to be used or to be useful in the future.

Claims 15-18 comprise similar limitation as in claim 14 and are therefore rejected by the same reason.

Claim 32

Regarding claim 32, appellant argued that the combination of Mehovic with Filepp does not suggest any aspect of observing and parsing queries made to the cache... and updating a list of entries queried along with a frequency count tally the number of times each entry has been accessed and based on frequency of access determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the availability source more or less often. On the contrary, as discussed above. Filepp teaches at [0821] that "when objects are requested from object storage facility 439, only the latest version of the object will be provided to guarantee currency of information to the user". This means that the objects in cache 439 are proactively updated, so that in only contains the latest version of the object, before receiving request for the objects. Filepp also teaches at [0823] that "The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of the objects", which means that

the frequency of updating object in caches is based on the frequency of updating the object as claimed.

[6] Claims 4 and 22 are unpatentable over Mehovic in view of Filepp and Khosravi-Sichani.

Regarding claim 4, Appellant argued that Mehovic and Filepp fail to suggest the basic features of claim 4, and that inclusion of Khosravi fails to cure that deficiency. The examiner respectfully disagree. As discussed in the rejection section, , Mehovic and Filepp teach the method of claims 1, 19 as discussed above. Mehovic and Filepp do not teach the step of processing query entry using round-robin algorithm as claimed. However, querying using round-robin is well know in the art, as exemplary by Khosravi. Khosravi teaches a method of querying replicate database using round-robin algorithm in order to "provide an even loadsharing of queries" (Col. 1 lines 55-65). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Khosravi with Mehovic and Filepp's teaching because employing round-robin algorithm would ensure that all queries are processed equally and providing an even load sharing of queries.

11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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